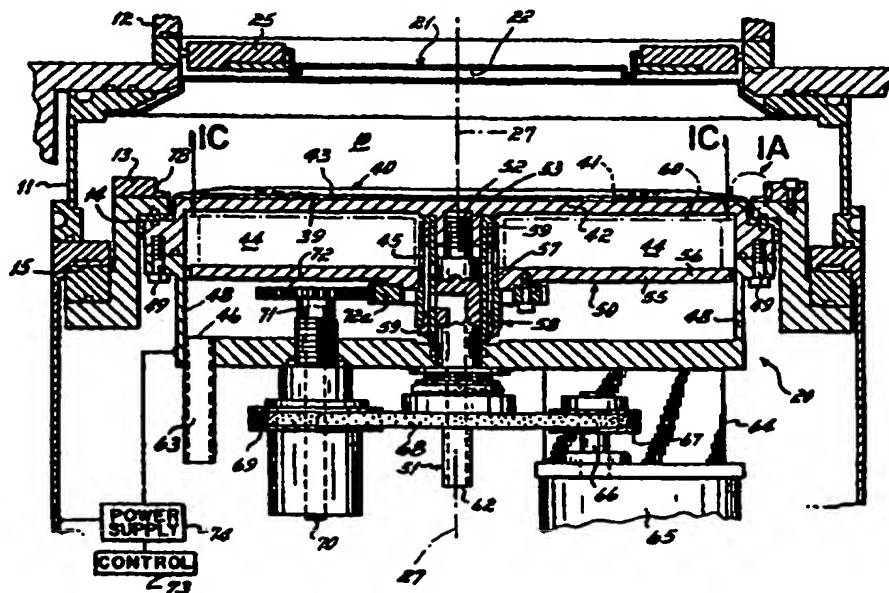




INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(21) International Application Number: PCT/US95/15324 (22) International Filing Date: 3 November 1995 (03.11.95) (30) Priority Data: 08/334,561 4 November 1994 (04.11.94) US (71) Applicant: MATERIALS RESEARCH CORPORATION [US/US]; Route 303, Orangeburg, NY 10962 (US). (72) Inventors: VANNUTT, Charles, N.; 7 Revere Road, Monroe, NY 10950 (US). DE, Bhola, N.; 23 Massachusetts Avenue, Congers, NY 10920 (US). ISHII, Jonathan; 20 Edward Street, Sparkill, NY 10976 (US). (74) Agents: HUMPHREY, Thomas, W. et al.; Wood, Herron & Evans, 2700 Carew Tower, Cincinnati, OH 45202 (US).		(81) Designated States: AL, AM, AT, AU, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TT, UA, UG, UZ, VN, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG), ARIPO patent (KE, LS, MW, SD, SZ, UG). Published <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i> (88) Date of publication of the international search report: 29 August 1996 (29.08.96)

(54) Title: METHOD AND APPARATUS FOR REDUCING ARCING IN PLASMA PROCESSING CHAMBERS

**(57) Abstract**

Arcing in a plasma process is reduced by shaping the target (40) and dark space shield (13) so that their peripheral regions curve away from each other, reducing electric fields and the propensity for arcing between the target and dark space shield. Also disclosed is an improved system for detecting arcing and presenting data related to detected arcs for analysis; the system generates a graph of the number of arcs, or rate of arcing, as a function of total power consumed, or alternatively a histogram of bars (120) each indicating the number of arcs having an associated magnitude.

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INTERNATIONAL SEARCH REPORT

Int. Application No
PCT/US 95/15324

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 H01J37/34

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 H01J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	DE,A,43 04 581 (LEYBOLD AG) 18 August 1994 see column 2, line 30 - column 4, line 29; figure	1
Y	DE,A,42 01 551 (LEYBOLD AG) 29 July 1993 see column 2, line 11 - line 26 see column 3, line 50 - column 4, line 64; figure	1
P,A	EP,A,0 625 792 (APPLIED MATERIALS INC) 23 November 1994 see abstract; figures	2

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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- *&* document member of the same patent family

Date of the actual completion of the international search

20 March 1996

Date of mailing of the international search report

19.07.96

Name and mailing address of the ISA

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Authorized officer

SCHAUB G.G.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 95/ 15324

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. CLAIMS 1-6 TARGET EDGES AND/OR DARK SPACE SHIELD SHAPED TO MINIMIZE ARCING.
2. CLAIMS 7-12 METHOD OF DETECTING ARCING AND VISUALIZE THE NUMBER OF ARCS VS. TIME OR THE MAGNITUDE OF ARCS VS. TIME.

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-6

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 95/15324

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE-A-4304581	18-08-94	EP-A- 0612097 JP-A- 6240454	24-08-94 30-08-94
DE-A-4201551	29-07-93	US-A- 5334298	02-08-94
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